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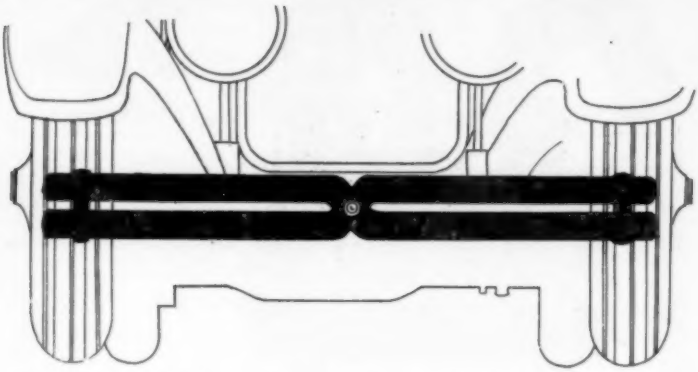

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Industrial Finishing

For Users of Fillers, Shellacs, Varnishes, Etc.

Published Monthly by
Practical Publications, Inc., 210 Holliday Bldg., Indianapolis, Ind.

Western Representative
Friedman & Peck
53 W. Jackson Blvd., Chicago
Phone: Harrison 4056

Eastern Representative
C. A. Larson
150 Nassau St., New York
Phone: Beekman 3471

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THE GLIDDEN COMPANY

National Headquarters Cleveland, Ohio

With the Editor

FURTHERING THE CAUSE OF BEAUTIFUL FINISH is something in which every progressive finisher is interested, and about which he eagerly reads everything of value he can find. All foremen finishers, working to the best of their ability and knowledge, have the same general purposes in mind.

Briefly these are: 1—To choose, or lend the weight of their good judgment and influence in having selected suitable finishes for their companies' products; 2—to work out methods and put under control conditions which will aid in producing good quality finishes economically; 3—to attend to the daily demands of production in a manner that will satisfy their employers, their employers' customers, and themselves.

These objectives can be accomplished only through co-operation. It is through co-operation that we progress; we do not progress individually in anything without the help of others. The greater the co-operation, and the further it extends, the greater will be every finisher's success, and the easier and happier will be his lot in life. In order to provide a medium through which and by which better co-operation might be stimulated and kept alive among finishers, INDUSTRIAL FINISHING came into existence.

Evidence that foremen finishers do welcome the opportunity of extending the hand of fellowship and the spirit of better understanding to brother artisans is revealed by the willingness and promptness with which so many have responded to the editor's requests for articles about their work and on subjects of general interest to the trade. The splendid spirit of broad-mindedness manifested by the majority of present-day foremen finishers is indeed remarkable.

The whole situation is well summed up in the words of a chief whose article appears elsewhere in this issue. Writing the editor recently in regard to himself and others in the big organization with which he is connected, he said, in concluding a letter that accompanied his article: "We are glad to be of some little service to the other members of our craft. The days of selfish mystery in finishing are over we hope, and we are glad to do our share in furthering the cause of beautiful finish." This is the right spirit, and we will all be better workmen for it. Let's see more evidence of "the good you do will come back to you," in INDUSTRIAL FINISHING.

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Cost Analysis in the Finishing Room

Production engineer outlines essential features entering into finishing costs and points out how cost analysis helps to determine what materials and methods are most economical

By Rudolph Willard

TO MANY furniture manufacturers, the mention of cost analysis brings up visions of an army of clerks, timekeepers, forms, records, and red tape. It is just like waving a red rag at a bull. But every manufacturer uses cost analysis in some form whether he is conscious of it or not.

Some plants keep detailed cost records of every piece or every run and use these records in helping set prices. Others set their prices on a basis of percentages arrived at from experience. There is room for honest difference of opinion as to which is the better method.

But cost analysis has a broader application than price setting. Every manufacturer wants to reduce costs. And it is in the reduction of costs that cost analysis finds its broader application.

Let it be stated right here that the writer has no "cost system" to offer. It is doubtful if anybody can lay out the details of a good cost system without intimate knowledge of the particular plant where it is to be used. But the discussion of a few principles of cost analysis may be of value.

Finishing room costs can all be classified under one of three heads,

Materials.
Direct Labor.
Overhead.

Materials and direct labor should bear a fairly constant relation to actual output, doubling when output doubles, etc. But most items of overhead are fairly constant regardless of output.

Under the classification of overhead come such costs as:

1. Supervision (foreman's salary).
2. Inspection.
3. Indirect labor (rousters, sweepers, etc.)
4. Heat, light and power (including compressed air).
5. Interest on investment in equipment.
6. Supplies, such as rags, pumice, rubbing oil, sandpaper, are sometimes classed as overhead.

Overhead being fairly constant regardless of production, it is more important to keep it low in factories that have big fluctuations, or seasonal production. If production is fairly constant, a dollar spent on extra supervision or extra equipment may save much more than a dollar on direct labor and material costs. But if production drops off a few months in the year, this extra overhead may amount to more than the direct savings.

An extreme case like this would be the equipping of a finishing room with mechanical conveyors to handle the product, time dip tanks, forced ventilation systems, etc. This type of over-

head is much more likely to be a paying investment where production is fairly steady and uniform.

In figuring the advantages of new equipment, the fairest way is to figure the cost of the equipment against the savings it will effect. But the cost of the equipment is not the price paid for it. Determine what percentage you make on your capital. If it is 15 per cent a year, then the annual investment cost of new equipment would be 15 per cent of its price. For $10,000 in equipment it would be $1,500 a year. Add to this figure any cost of operating the equipment such as power, repairs, etc., and then balance the total cost against the savings in labor or materials.

Many factories put great emphasis on reduction of labor cost but absolutely neglect material costs except as to the price paid for materials. It is well worth while to find out what relation labor and material bear to each other. A new method that saves 10 per cent of the time but uses 25 per cent more material might be good for filling with cheap material but bad for lacquering with expensive material.

There are some cases where sprays waste enough more material than brushing so that they cost more, in spite of the saving in labor. Of course the quality of the work and the availability of brush men may influence the decision, as well as the larger production per square foot of floor space with sprays. This example shows, however, that it is impossible to tell which of two methods is cheaper without complete cost analysis of all factors of expense.

It is not always sufficient to analyze the cost of one operation only. It would be quite possible to cut the cost of the filling operation but get poorer filling, which would necessitate re-coating or patch work that would cost more than the saving in the filler room. Rubbing is one of the most expensive of the finishing processes. It is often possible to make a big saving in rubbing expense by a small increase in expense in keeping the work clean, or sanding out dirt during the rest of the finishing process.

One big source of expense which is seldom analyzed is patching, repairing, and re-coating. Often the use of a poor shellac substitute, or its careless application will cost far more for patching or re-coating than the saving effected by using the cheap substitute. It is hard to get an accurate cost analysis on patch-work, but a tally of pieces patched showing the defect will often point to some place where "cutting the corners" doesn't really pay. Sometimes a rough piece of floor will break enough posts in a month to pay for re-flooring.

A point that is often overlooked in deciding between two varnishes, or shellac substitutes, is the spread. Some varnishes go farther than others. It is easy to find the number of square feet per gallon by measuring the surface of a case. Split a run of cases and finish half with each varnish, measuring the amount used. Multiply the number of square feet in one case by the number of cases and divide by the number of gallons of material used. This will give the spread in square feet per gallon. Of course both varnishes should be applied so as to give the same body in order to get a fair comparison. The more expensive ma-

terial may spread enough farther to make it really cheaper.

A detailed cost system is good if it is properly operated and if the figures it gives are regularly checked up to see whether results are normal, and if not, why. But whether you have a cost system or not, it pays to analyze costs. And the fundamentals of cost analysis are simple. "Be sure you have all the facts before deciding."

Cutting Colors With Spray Gun.

After a little practice, a skilled man with a spray gun can cut from two to four colors on a piece of decorated furniture. For cutting straight edges it has been my experience that a straight strip of hardwood, about one-quarter inch thick and beveled down to a thin edge, is very satisfactory. This can be kept clean and if it is broken, it can be repaired or replaced easily and cheaply. If sheet metal is used, the working edge soon becomes uneven, and you will have a ragged edge where the color is sprayed.

In cases where the surface is curved or irregular so a wood guide strip cannot be used, heavy smooth paper may be wrapped or pasted in position to guide the color spraying. This requires very little time and the work can be done quicker than cutting by hand.

Circles or anything else of that nature are laid out, and after one color is dry, the paper mat is pasted over it and the second color is sprayed on. Afterward the paper is pulled off, the paste is washed from the surface and the job is carefully sanded. This gives a clean-cut piece of work which could not be easily duplicated by hand, except with several coats.

Doing this work is a pleasure after a man gets used to it, but it requires patience and skill. A careless man can never get anywhere with this kind of finishing. A straight spray nozzle is best for this work; a lower pressure can be used and the spray can be controlled better. If colored lacquers are being used, and one color is sprayed over onto another by accident or mistake, it can be easily taken off without harm to the finish, by wetting with water and sanding carefully with fine sandpaper. —J. K. Cooper.

The Evils of Glue Sizing.

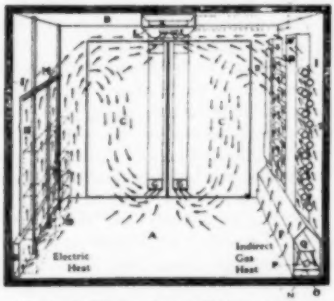
First in importance in finishing all kinds of woods is the necessity of the finisher to be in close touch with the cabinetmakers. Many times there comes to the finishing room, woodwork which has been sized with a thin solution of glue, but it is very hard to detect this condition. Sometimes it can be detected by wetting the finger and touching the face of the wood, but if the glue has been applied very thin and sanded off the surface, it cannot be detected until the stain has been spread and dried. Sizing the wood with glue should never be allowed, because it adds to the finisher's difficulties in turning out good work. On a glue-sized surface it is impossible to match colors, and glue sizing takes away the natural color of the wood. In time the finish applied over a glue-sized surface is likely to peel off. This process is only used to hurry up the work and make less sanding for the cabinetmakers.—A. R. Boles.

Drying Finishes by the Baking Process

An explanation of the modern oven-drying process and some of the methods and accessories employed for quickly drying and hardening finish coats

By An Engineer*

BAKING processes are of vital importance in modern production, since the industries of today demand very exacting results. Baking gives economy of time, labor and floor space; but more important than lowered production costs, the resulting products have qualities which can be secured only by oven baking.



Typical "Young" ventilating and circulating system in oven, showing how same results are obtained with either electric or indirect gas heating.

A, Floor.
B, Roof.
C, Doors.
D, Electric heater locations.
E, Fresh air duct.
F, Indirect gas h't'r.
G, Floor vents.
H, Wall shields.
I, Side walls.
J, Roof vent.
K, Outside vent.
L, Vent breeching.
M, Electric heater supports.
N, Secondary air duct.
O, Secondary air slide.
P, Burner.
Q, Burner baffle.
R, Outlet manifold.
S, Manifold.
T, Radiator tubes.

In many finishes there is usually a drying oil which must be partially driven off by vaporization, but which is principally to be hardened by combining with the oxygen of the air (or oxidation). Both vaporization and oxidation are greatly quickened as the temperature increases, hence a minimum of chemical driers, yet more oil can be used in finishes that are to be baked.

As a rule it is not desirable, at first, to subject the article being baked to the highest temperature required. The result would be to "surface dry" the exterior before the interior had dried. This would give cracked or pitted coatings and unsatisfactory results in other respects. Penetration must be permitted, hence the "soaking heats" frequently found necessary.

A properly designed oven can and does supply the heat and oxygen uniformly to all parts of the work as fast as the latter can safely absorb them. It prevents cold air from reaching the work, and provides ample ventilation to carry off the moisture, fumes, and used air. The approved oven must do much more, but I am mentioning now what takes place within the oven after the heat is applied. Whatever the process, industrial baking requires that a more or less definite heat cycle be applied to all parts of the product.

The use of oven baked finishes is thoroughly time tested in many lines of manufacture. Its rapid

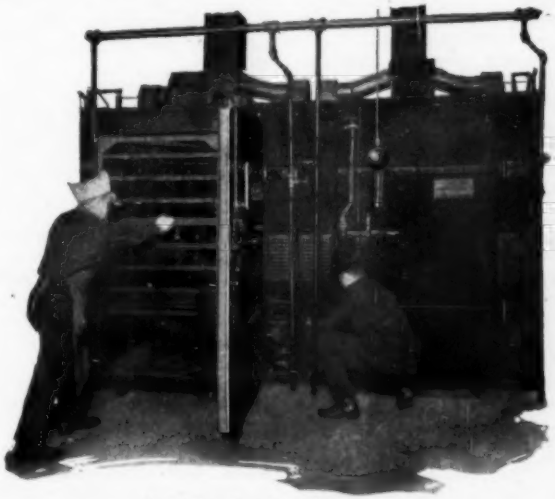
*Young Brothers Co., Detroit

growth in recent years is the result of a demand for production economy and for finishes which will withstand harder usage in service. Ovens, finishes and methods have been greatly improved in the last several years. Any desired effect can be produced from a dull finish to a high gloss.

A properly baked finish is hard but the body is tough. It not only can withstand abraision, as in cleaning off accumulated dust, but hard blows or even bending

quickly and independently of weather or air conditions. Thus, the product is moved promptly to completion, and the usual long time "in paint" is avoided, as well as the large amount of floor space thus needed, and the capital tied up in the product being finished. As quickly as a baked article cools to about normal atmospheric temperature, the surface becomes hard and remains so.

Even where quick drying enamels of the pyroxylin type are used, oven baking is frequently



Portable rack entering baking oven.

may have little or no effect upon it.

Most work requires two or possibly three coats, while some may need but one; in comparatively few cases four or more are used. This is influenced by the character of the under surface, the particular finish used, the class of work done and the method of application.

The coats are applied and baked

employed for the undercoats. Better adherence, and a resistance to the solvent action of the final coats, is secured.

A number of methods are commonly used for applying the finish to be baked.

Dipping is most commmonly used for parts that are not too large or complex and which permit of proper drain and drip.

Spraying is frequently used on large or complex parts, and where dipping is objectionable. By spraying it is possible to confine the finish material to the surfaces on which it is desired.

Flowing is mostly used for large articles which permit proper draining.

Brushing should be used only for very limited amounts of work, or where extreme care is needed to leave untouched such parts of the surface as are not to be coated.

Tumbling is used for small parts when coats are very thin and in cases where a slight mark, left by parts touching one another during baking, is not objectionable.

Offset presses are used for lithographed designs on metal. Lacquer, colors or insulating varnish, where the whole sheet is covered, may be applied by rolls.

Surfaces which are to be coated must be clean. Grease, rust or oil prevents proper adhesion of a finish, while dirt even in crevices will cause trouble. High quality in baked finishes can only be secured through the utmost cleanliness. The oven, the parts to be finished, the finish itself, the air supplied to oven and room, the building walls, floor and ceiling—all must be clean.

Even where a clean air supply to the department and to the oven is assured, care must be taken that an excess of air is furnished; leakage then will be outward. On the other hand, if the room is under even a slight suction, dust and dirt will be drawn in through every crack and crevice. Cleanliness is less expensive than the refinishing of defective parts.

A proper standard of cleanliness for baked finishes depends upon the class of work to be produced, and upon the method of applying the finish. Automobile sheet metal parts, finished by dipping, are exacting in the requirement for careful cleaning of the metal. Even inside surfaces and crevices of the parts to be dipped should be free from oil and dirt, as otherwise this would wash out and contaminate the finish.

The proper ventilation and the circulation of air within an oven is of the greatest importance. Ventilation must carry off any fumes or vapors, and supply the fresh air (oxygen) necessary to properly harden any finish or binder.

Circulation must distribute the incoming air and sufficiently equalize the temperatures within the oven to secure uniform baking. Temperature variations can be reduced to limits as narrow as the nature of the baking process demands. In this matter, as also in maintaining the definite zones of temperature difference sometimes needed in large ovens, experience and careful oven engineering are the basis of successful designs.

The natural tendency of heated air within any baking compartment is to circulate in accordance with the temperature differences involved. However, the direction and intensity of air currents may be influenced or controlled by mechanical ventilation, by concentration or distribution of heat supply, and by the arrangement of vents and ducts within the oven.

Ventilating systems vary with baking conditions and oven size; small ovens usually have a simple roof and floor vent. A typical Young Brothers system for a medium size oven is shown in the accompanying drawing. Fresh

air ducts extend along the sides and out at the front and back. All incoming air enters these. Since the ducts are close to the heating units the air becomes preheated before entering the baking compartment. Heated air currents rise at the sides of the oven. In the drying of any finish the volatiles are at first driven off rapidly.

Vents having independent dampers are supplied at the top and bottom both at front and back. Ordinarily, during the first part of the bake, all these vents are open. Part of the rising air goes through the roof vents, carrying with it fumes or moisture from the upper part of the oven. Part of the fresh air drops as it gives up heat to the product, and is drawn out through the bottom vents. The air thus circulates throughout the oven, supplying oxygen, and equalizing temperatures.

As the drying proceeds the top vents are nearly closed. The heavy, less heated air settles to the floor and is drawn out through the bottom vents.

A supply of air to the oven department must replace air removed by the oven vent, or by spray booths, and exhaust fans; and it is important that fans, breeching, vents, screens, etc., be cleaned regularly to avoid reduction of their air capacity by condensed fumes or by dust.

Ovens may be heated with any means of industrial heating that is desired, so long as the heat introduced into the oven is "clean heat." Steam heat, indirect gas heat, and electricity are favored for ovens in which finishes are baked.

The loading and unloading of parts baked is the largest item of labor in oven operation. In most cases of large production conveyors are easily the best investment. Their types are many —their advisability and design dependent upon many factors. Both continuous and intermittent conveyors are used. Trucks, cars, lift racks or carriers are more commonly used than conveyors, and they are usually better adapted for medium production, or a greater variety of parts and baking conditions. In any case the methods of oven loading vitally affect costs and results—they are a fundamental point in oven design.

How to Get a Presentable Finish In Quick Time.

A finisher often gets jobs which are necessary to hurry through and which he tries to do as good as possible, considering the time in which he has to do them. For instance, if the piece to be finished is of hardwood, such as oak, mahogany, or walnut, which requires filling, a little benzole should be added to the filler. This makes the filler dry very rapidly, and in four hours time the article can be coated with a thin coat of shellac. Otherwise it would have to stand at least ten or twelve hours.

Half an hour after applying the first thin coat of shellac, the surface is ready to be sanded with fine sandpaper. This operation should be followed with dusting carefully, then another coat of shellac applied. In about an hour this can be lightly sanded, after which the surface should be dusted and coated with the first coat of varnish. By this process the work can be made a good presentable job with one coat of varnish.—A. R. Boles.

French Walnut Finish

Chief foreman finisher of large furniture manufacturing corporation insists that modern French Walnut is an easy finish to produce, and he explains in detail how it is done

By Cliff Stanton

SO MUCH has been written of late about the new "French Walnut" finish that many finishers are of the opinion that it is a thing difficult to obtain. We have found it an easy finish to produce, and it is my purpose here to tell how it is done.

The grade of furniture I have in mind is a good grade of gum-walnut combination bedroom furniture. Both red and sap gum are used without a great deal of attention being paid to the matching and selection of the gum-wood, except for the elimination of dark streaks and knots.

To get a good uniform French Walnut finish the finishing process must begin in the cabinet department. By this I mean that the cabinet foreman must understand just what kind of a surface is required for this finish and then give us such a surface. This does not mean that all surfaces must be "hand sanded". Far from it!

All flat surfaces will be sanded and polished on the Mattison, Curtis and Wysong & Miles type sanders, and all shapes can be sanded on pneumatic spindles, segment wheels, buffers, etc., with a minimum of hand touching up with fine sandpaper.

Close co-operation between the cabinet foreman and the finishing foreman is the first step towards a perfect finish.

The second prerequisite is a group of live, wide-awake finishers who know how to follow instructions. It goes without saying that the gang leaders must know how to give instructions. There is a vast difference between telling a man how to do a new job and instructing him to do it. Think about that point.

Before going into the finishing department all pieces are thoroughly dusted with pneumatic brushes to clean off all dust.

The first operation is to stain all gum parts with a standard commercial French Walnut water stain, cut with clear warm water. Light spots and sap gum are stained twice. This is allowed to dry from two to four hours; then it is followed by French Walnut bleach which is reduced 60 per cent in alcohol. This coat also is allowed to dry for about two hours, after which it is thoroughly sanded with No. 0000 sandpaper and dusted carefully. It is then filled with French Walnut filler cut at the rate of 7 pounds of filler to a gallon of benzine.

The filler is brushed on heavily and allowed to set until it loses its gloss, when it is "padded in" across the grain with burlap pads. Padding is followed by cleaning up with cheese cloth. All excess filler in ornaments, veins, corners, etc., must be picked out rather than being brushed out. If these deep places are brushed some of the flat surfaces also will be brushed, and the brushed places will show up

unevenly when the lacquer is applied.

The piece should be allowed to stand at least twelve hours after being filled before the next operation, which is a spray coat of lacquer.

Right here the question of finishing room temperature must be considered. The foregoing operations should be done in a room carrying a temperature of from 65 to 70 degs. F., with good air circulation, but from here on it is absolutely essential that the room temperature be from 70 to 75 degs. F. with a fairly low relative humidity.

In addition to the temperature of the room the lacquer and varnish also must be at the room temperature. The best way to get this condition is to store the drums containing these materials, in the finishing room for a few days before the materials are used.

In my opinion this is a much safer method of obtaining proper material temperatures than to depend on the various more-or-less-temperamental, spray-nozzle, temperature regulators.

The first lacquer coat is "Advance" lacquer sprayed on. This dries from four to six hours. The surface is then sanded with No. 0000 sandpaper and thoroughly dusted. This is followed by a coat of plain maple polishing varnish. This dries for 24 hours, and the tops and plain flat surfaces are again sanded with No. 000000 sandpaper. The case is again dusted and a second coat of the same material is applied.

This should stand from eight to ten days in a room having a temperature ranging from 60 to 70 degs. F. before it is oil rubbed.

This operation has much to do with the final appearance of a French Walnut finish. This finish being light, it demands a surface which has life and snap but not a high gloss. This is obtained by covering the entire varnished surface of the case with a coat of parafine oil over which is sprinkled No. 3 F pumice stone; the whole surface is rubbed with felt blocks propelled by hand power to which is added an exact amount of "elbow grease". The precise quantity of the latter cannot be specified here, but the experienced rubber knows how to get the proper surface with the least expenditure of this precious commodity.

After all the oil and pumice has been cleaned from the surface, the ornaments, corners, etc., the finish should show up clear and transparent. We know of no other finish which brings out the natural markings and beauty of the wood as does this French Walnut.

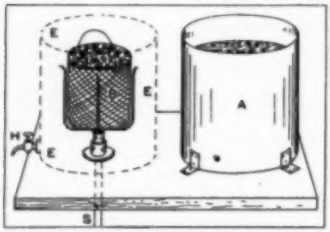
Dipping and Whirling Process for Small Articles.

In some industries it is required that small metal articles, such as telephone parts, typewriter parts, toys, buttons, etc., be finished in stove enamel, varnish or lacquer. Personally I have experimented with various methods to find the most economical process, and have reached the conclusion that the "whirling" method is best.

Suppose for example we are going to finish small typewriter parts in black enamel or lacquer. The majority of dark finishes require only one operation, but if two coats are necessary, the process is simply repeated after the first coat has dried thoroughly. The metal parts to be finished are warmed to about 70 deg. F. Then they are placed in a wire-mesh container shaped similar to a

pail. The wire mesh is heavy material but the openings in it are small enough to prevent any parts from passing through.

The pail of small articles is let down in a container in which there is enough of the proper finishing liquid to cover the wire-mesh pail and its contents. The liquid, whether enamel, varnish or lacquer, must be thinned to the right consistency for this kind of work. With the wire-mesh pail full of small parts and completely submerged, the pail should be drawn up and let down again and shaken or whirled by hand a few times to insure all parts being completely covered with finishing liquid.



A sketch of the apparatus in which *A* represents container for finish, and *B* the wire-mesh pail filled with dipped articles and placed in brackets, which rotate by means of power transmitted through shaft *S*. *E* is phantom view of stationary drum surrounding the rotating brackets.

After this thorough dipping the wire-mesh pail full of material is lifted out of the liquid and let down into the brackets of a frame which rotates on a vertical axis inside a container, as shown in the phantom view at the left in the accompanying drawing. The touch of a button or pull of a lever causes this vertical shaft and bracket to revolve at high speed, thus whirling the wire-mesh pail full of freshly dipped parts around centrally inside a container which catches all the throw-off liquid.

The spinning or whirling at high speed quickly clears the dipped parts and the wire mesh of all excess finishing liquid and leaves all parts evenly coated. This surplus liquid strikes the sides of the container (E) and drains down to the bottom from which it is recovered by opening drain cock (H) and drawing it off into another vessel. This material can be poured back into container (A) and used over again.

Following the whirling operation the wire-mesh pail full of parts is removed from the machine. If the right material has been used and all the surplus thrown off by centrifugal force, the finishing material on all articles should be almost set. The articles can now be dumped onto trays and placed in oven driers or air-drying racks, depending upon whether the finish is of the kind that is to be baked or air dried. Care must be taken that the finish used has the right setting time; otherwise the articles will mark and stick together when dumped from the wire-mesh pail. Most manufacturers of enamel and lacquer will supply suitable material if the process is explained to them.—A. Lacy, London, England.

C. M. Lemperly Advanced By Sherwin-Williams Co.

H. D. Whittlesey, vice-president of the Sherwin-Williams Co., of Cleveland, announced January 5, the appointment of C. M. Lemperly as director of sales development, a new activity devoted to the development of sales and marketing plans on all of the company's products. Mr. Lemperly has been in charge of the company's advertising and publicity for the past eleven years and has complete knowledge of the ins and outs on paint and varnish selling.

Suggestions For the Spray Operator

Foreman finisher of desk factory gives some valuable pointers for getting good results with the spraying equipment and compressed air used in modern finishing rooms

By Arley E. Jones

TAKING into consideration some of the spray apparatus in use, it is remarkable how it is possible to spread as good coats as we do.

There are a few good rules to follow, and there is a special need to utilize every effort in perfecting equipment used for spraying paint, varnish and lacquer.

To have clean dry air, an even flow, and the correct pressure—these are perhaps the main essentials in order to lay good coats. It would be impossible to lay down a standard rule as to just the pressure to use in all cases. Mechanical problems vary with different spray guns, as well as with variations in the weight and viscosity of materials used.

Each operator must experiment and decide what pressure is best fitted for his special needs; then keep air valves set so as to maintain an even flow of air. If other air machines are on the same line, a pressure valve of proven worth should be set for each spray outfit.

Some manufacturers purchase and install air compressors of too small a capacity, then they add other sprays and perhaps a few rubbing machines, until it is impossible to produce air enough to carry material from the spray guns.

Pitted uneven work is very often caused by using cold air. The air and material heaters that are sold with some installations are jokes as far as warming air or material is concerned and they are bad fire risks.

A simple air heater, and one with no fire risk, can be constructed with a 6-inch iron pipe, 6 feet long and having a small steam coil on the inside. Cold air enters one end, is heated and is drawn out the opposite end. A drawing of the device appears in Fig. 1.

Oil working through the air line from the compressor will cause the finishing department a great deal of grief. One drop of machine oil in varnish or lacquer will spoil a large surface. We have all seen rings of varnish, which at first glance appear to be drops of varnish carelessly dropped on the surface. But on

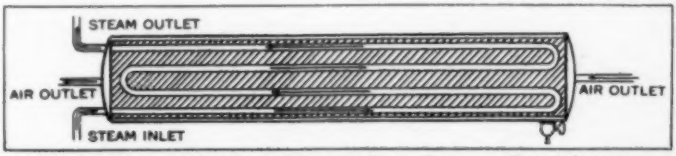


Fig. 1—A steam coil inside a cylinder in air line, makes an excellent air heater.

close examination we find a thin spot surrounded by a ring of varnish a little higher than the surrounding surface. These are oil rings, and it seems as if some compressors are especially designed to pump oil in the air line.

The average water and oil traps are only partly effective. After experimenting with several kinds and makes, I find that the home-made trap or air strainer,

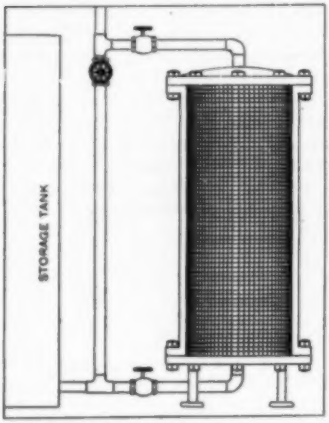


Fig. 2—A filter in which the compressed air is cleaned of water and oil.

as illustrated in Fig. 2, will entirely filter air of any water and oil that might cause spray trouble. It is made of a 12-inch pipe with flanges and blind flanges bolted on so they are easily removable. On the inside is fitted a cylinder of fine wire mesh and filled with sea moss which should be changed at least every six weeks.

This type of apparatus 4 feet long will filter the air for ten to twelve sprays. I would not advise one being made of less than 10-inch pipe, 2 feet long, for installations of three to five sprays.

The tips on most spray guns are very delicate and just a slight bruise will spoil them for good work. An extra supply should be kept in stock.

Material hose used for varnish should not be used for shellac or lacquer.

Painting Zinc and Galvanized Iron.

More or less trouble generally is experienced in making paint materials adhere to zinc or galvanized iron surfaces. These surfaces when new always have a "greasy" feel to them, even though there may be no grease actually present. This "greasy" feel may be removed to a certain extent by washing with naphtha, but this treatment is seldom severe enough to put the surface into proper condition for the paint coats to stick as tightly as they should.

It is claimed by some, who have investigated the question thoroughly, that this property of zinc or galvanized iron not to hold paint is due to the zinc combining with the oil of the paint film to produce a soap. This soap layer, it is claimed, forms between the metal surface and the paint and thus prevents the paint from sticking to the surface, so that upon subsequent contraction and expansion of the metal the paint flakes off.

Regardless of whether this or some other condition is the true cause of this non-sticking condition, it is a well known fact that zinc or galvanized iron, which has been exposed to the weather for some time, holds paint much better than fresh surfaces. This is probably due to the zinc surface being attacked by oxygen and

other chemicals, which are present in the air and in rain water in various amounts, to form zinc salts which have a rougher surface and which do not re-act on the paint film in the same manner that the zinc does.

This "weathering" of zinc and galvanized iron can be artificially produced by the use of various chemical washes which remove any grease that may be present, and in some instances form a coating of zinc chloride or other zinc salts to which paint adheres more readily than to plain zinc surfaces.

One of the best chemical washes for this purpose is made as follows: Dissolve 12 oz. of copper chloride, 12 oz. of copper nitrate and 12 oz. of salammoniac in 4½ gallons of water, then add 12 oz. (by weight) of hydrochloric (muriatic) acid. This solution should be applied to the metal, allowed to dry until the next day, and the bloom brushed off. Then the paint should be applied as quickly as possible.

Another wash, which has been used quite extensively, is made by mixing one part (by volume) of commercial hydrochloric (muriatic) acid with four parts of water. This solution should not be allowed to remain on the surface very long, especially in the case of galvanized metal, for fear of dissolving most of the zinc. As soon as the surface is dry the paint may be applied.

Still another zinc wash is an ammonia solution which should be applied to the surface as strong as the workmen can stand it. This solution, however, has the drawback of having a rather disagreeable odor, and it does not give as good results as some of the others.

Still another method of treating galvanized iron or zinc is to first wash the surface with naphtha or benzine, and then coat the work with a solution of copper acetate made by dissolving six ounces of copper acetate to a gallon of water. After this solution is dry the painting operations may proceed in the usual way.

It is to be understood, of course, that an earthen or glass vessel should be used for holding any of these solutions. Care must be taken also to protect the hands of the workmen, especially where a solution containing acid is used. This can be done by thoroughly saturating the hands with linseed oil and wiping off the excess oil with burlap or an old cloth, before beginning the work.

As a general rule, the best method of applying any of the solution is to wash the surface with a cloth or piece of burlap wet in the solution; or a soft, flat brush may be used if desired.

Another important point to bear in mind is that the metal should be painted soon after the galvanized iron wash has done its work and the moisture has evaporated from the metal. If too much time elapses between the wash treatment and the first coat of paint, much of the good effect derived from the wash will be lost.

Where it is not desired to use one of these chemical washes, and if the equipment is available, the use of a sand blast is recommended. This roughens the metal and gives the primer the safe foothold that is desired. Where the sand blast is used the work should be coated as quickly as possible to prevent the formation of rust, should the thin coat of zinc on the galvanized metal be broken by the blast of sand.—C. C. Culbertson.

Causes of Greenish Appearance in Varnished Surfaces

This frequently recurring trouble is clearly explained by an expert, who gives several valuable suggestions as to how to prevent the undesirable effect

By F. L. Barringer

SOME years ago an old established varnish concern received, from a furniture manufacturing customer, a bitter complaint on the manner in which their product had developed a greenish cast, on a run of table tops. It was asserted that the trouble had not been noticed until a particular drum had been used, and the difficulty was laid at the door of its contents in terms very far from ambiguous.

Being veterans in the game, and not given to tinting their output in klaeidiscopic hues, merely to lend variety to life, the varnish people put a practical man on the train with instructions to investigate. In the meantime they wrote that while heavy coats of so-called dark varnishes may, in certain lights, show a greenish cast, the pale varnish supplied on their order could not possibly of itself give such an effect.

The letter then went on to list some half dozen or more reasons why a greenish effect might appear traceable variously to the stain, shellac, filler, sanding, veneer, glue, etc. The furniture people were somewhat taken back, but refused to be convinced until the "trouble man" appeared. This gentleman, after a brief investigation, learned that on the tops in question mahogany veneer had been used, stained dark red with a water soluble aniline.

As this normally leaves a bronze colored sheen when dry, the practice is either to apply a wash coat of shellac next, or tint the first coat of varnish slightly with the same aniline. Through an oversight, neither of these precautions had been taken, and the varnish concern's representative was thus readily able to convince his customer that the drum in question was not the culprit.

The moral is simply not to blame the varnish, even though as the final coat of the finish the greenish effect seems to be most inescapably related to it. The fact is that the root of the trouble may be so fundamental as to lie with the veneer glue itself. With veneers cut extremely thin, as is so generally the case at present, careless gluing methods permit much glue to come through the pores.

Even when the wood is sponged with hot water, dried and sanded, this is not a complete remedy, for many of the pores may still be clogged. As a result filler and stain combine with the glue and an unhealthy action is thus set up, which in time clouds the finish in the spots affected and, from certain angles, gives a greenish aspect.

Assuming that the above condition is not a consideration, the trouble may be traceable to improper application of the stain. If applied too heavily, enough of

the color will penetrate the wood, but much will remain on the surface and form the bronzy deposit previously mentioned. If this is not wiped up before drying, or following this with a rag wrung in alcohol, the bronze is likely to show through any number of clear varnish coats. The remedy is to see that the stain is free from insoluble matter in the beginning, and to apply only enough to give the proper color to the wood.

As an extra precaution against this contingency, some finishers cut down the strength of the stain coat below that required to give the necessary color, relying on the addition of some stain to the first varnish coat to provide the desired tone. Unless the aniline used to tint, is of the non-fading variety (oil and spirit solubles are not) the finish color will fade upon continued exposure to light. Out of this grows a slightly greenish cast, apparently attributable to the varnish.

Probably the commonest source of the trouble under discussion is filler. When used from the original metal kit or from a mixing pot, and the goods are not quickly used or kept covered, the top portions will harden. In the same way filler allowed to stand in barrels will lose some of its oil content through absorption by the wood or seepage between the staves. In either case the filler, especially if it is of poor quality (naturally short of binder), will be too thin when it comes to be worked into the pores. Being hard to wipe off, it will consequently leave too much on the surface, and the finish will be not only clouded but a greenish cast will be almost inevitable.

If the filler is applied with its full quota of binder present, that is in proper condition, it may not even then be easy to clean off. Wood improperly sanded, leaving multitudes of small wood fibres sticking up to catch and impede the filler, makes wiping difficult, and holds filler on the surface with the results before mentioned.

Mahogany, being an especially spongy wood, a very light coat of shellac should be applied over the stain to bind down the loose fibres which even careful sanding leaves behind. Much of the blame often attached to black filler as a source of green varnish effects, is probably more attributable to the foregoing general conditions than to the mere fact of its being black.

This about concludes the number of established causes of greenish cast, as it is hardly necessary to warn against the use of orange shellac as opposed to the natural. In some quarters it is maintained that the trouble may also be caused by improper sanding; either the varnish is sanded prematurely or a sandpaper of too coarse a grade is used. In either case a grayish effect is produced which, under successive coats, takes on the abhorrent greenish tinge.

Kentucky Paint Works Remodeled.

The Kentucky Paint Works, the Covington, Ky., paint factory, of which A. L. Boehmer is president and general manager, has recently undergone a complete revision and remodeling in the interest of increased efficiency and better convenience.

Western Zone Convention.

Plans are now being prepared in the Pacific Northwest for the fourth annual convention of the Western Zone of the N. P. O. & V. A., to be held in Seattle, July 16, 17 and 18.

Conveying Auto Frames Through Enamel Dipping and Baking Operations.

At the plant of the Midland Steel Products Company, Cleveland, Ohio, they are manufacturing automobile frames at the rate of over 6,000 per day. Every process in this factory has been worked out with great thoroughness and attention to details.

Each one of these frames is enameled with a coat of black enamel before it is ready for shipment. This work is done by passing the frames through a continuous enamel dipping tank on a conveyor and then transferring them to a chain conveyor which carries them through the long enamel baking oven. This last conveyor carries them directly to the loading platform where the finished frames are loaded into cars for shipment.

In this enameling oven, these frames are hung vertically and very closely together to secure maximum production from the oven. With the frames moving forward continuously, it would cause untold damage and delay if one of these frames would fall off of the conveyor hook. To guard against trouble from this source, the plant engineers have devised an automatic emergency stop which stops the conveyor the instant the frame falls from the hook.

At the upper end of the automobile frame as it hangs in the oven, is a cross piece which extends out beyond the side members of the frame. Just beneath the position of this cross piece the engineers have stretched a cable which extends the full length of the oven. Should one of the frames fall from the conveyor hook, this projection from the frame cannot possibly get by the cable but pulls down on it. This operates the emergency stopping switch.

An E. C. & M. limit switch has been installed for this service. The cable through the oven is always held in tension by a heavy coil spring which works under compression so that any additional weight on the cable will further compress this spring. Fastened to the end of the cable is a rod which connects directly to the lever of the limit switch.

View of frames leaving oven.

An adjustment screw is placed in this extension rod so that the system can be adjusted to suit the variation in length of the cable due to the high operating temperature in the oven. By this means the safety switch is always at hair trigger setting so that all movement of the conveyor will stop instantly when anything strikes the cable.

As this enameling oven is built in a huge S form, they have had to install four of these safety cables and limit switch emergency stops.—*Current News;* The Electric Controller & Mfg. Co.

It's one thing to stall and make excuses, but quite another to go ahead and make good.

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Examining Paste Filling With Glass.

I have found the magnifying glass useful in examining the filling, because the eye alone fails to adequately estimate the degree of perfection that has been produced. It is interesting. At times I have thought my work simply perfect, but the glass has told me differently. Then the thing to do was to apply another but thinner coat of filler, or a coat of surfacer, that is if the job had to be an extra good one. For certain kinds of work this extra care is quite unnecessary, of course.—A. K. A.

Correction of Error.

In the article entitled "A More Rapid Automobile Painting Schedule," by A. F. Eibell, pages 35, 36 and 37, January issue, the printed statement recommending "caustic soda or some other alkali solution" as a remover, is in error. Mr. Eibell does not approve the use of such make-shift materials; he always advises against the use of any but the standard commercial removers for paint, varnish and baked enamel.

On the same page, 36, under heading "Fifth Day" where it starts out only with "Rub," it should read, "Rub, stripe and finish, and on sixth day assemble, touch up, etc."

Rubbing Paste Filler.

When you begin rubbing paste filled see that it is ready for the rubbing pad. The filler should not have been either too dry nor too liquid for good filling. If too dry, then it will be more difficult to rub properly, or to get the stuff well into the pores; if too liquid, some of the filler will be taken from the pores.

The rule as regards time for rubbing is, "as soon as it turns gray." This may take about twenty minutes, depending on conditions. If the room is very warm the filler will set quickly; if cold or damp then more time is required.

After the rubbing off, the work may be left for several hours to dry; some finishers allow as much as two days. Then comes sanding to make smooth; then dusting off, which is important because if it is left on, the dust from the sanding would mar the finish. The same before filling; dust off, for the dust, etc., may get into the pores and so defeat the filling. The filling should be quite dry before application of surfacer or varnish coat; if it is not dry, then you may expect trouble with the finish.—A. A. K.

Beatty Heads Publicity and Press Committee.

C. F. Beatty, New York advertising manager for the New Jersey Zinc Company, has been named by President Peters of the National Paint, Oil and Varnish Association as chairman of the Publicity and Press Committee for that organization.

The new committee is a combination of two committees which formerly functioned only during the annual convention period. The growth of the association, however, together with the importance of the programs that it is fostering has made it advisable that the trade be kept fully and expeditiously informed of current happenings.

J. H. Wood President Of Standard Varnish Co. of Illinois.

J. Heath Wood has been elected president of the Standard Varnish Co. of Illinois, by the directors of the concern, to succeed Richard D. Robson, whose untimely death occurred Nov. 14.

Industrial Finishing

PRACTICAL PUBLICATIONS, Inc.
Publishers.
210 Holliday Building
Indianapolis, Ind.

Issued monthly. Distributed exclusively to executives and foremen finishers in all kinds of industrial plants where finish coats are applied.

FEBRUARY, 1925

Service is Needed With New Finishes and Equipment

Notwithstanding all that has been done in the way of improving finishing materials and the equipment used for applying and conditioning finish coats, there has never been a time when service was so much needed as it is today. Service is needed as a follow-up in connection with the sale of modern finishes and finishing room equipment in the industrial field.

New finishes and new kinds of equipment are far from being fool proof. To produce satisfactory results they must be used correctly, but how to handle them properly under different conditions cannot be learned in a day, nor a week; perhaps not even in a month, or several months. From time to time new conditions appear which exercise more or less effect on the later finishes and equipment.

The foreman finisher is held accountable for the volume of production, as well as for the quality and appearance of the finished goods. He cannot afford to jeopardize his position by doing a great deal of experimenting. Of course, so long as every "try" he makes proves successful, and every guess he ventures turns out right, why that's fine with the company. But just let some of his trials prove failures, and some of his guesses go wrong. It's a different story.

The manager's or superintendent's looks speak more plainly than the voice. Whether spoken or not spoken the crisp words, "Well, let's get down to business now," ring in the foreman finisher's ears until his neck gets red. When he's in trouble he must get out of it "right now." It's a typical case where service is needed, and needed badly. The foreman finisher would be mighty glad to see a service man, or a salesman who is a practical man, show up in person. Trained service men and practical salesmen can save their concerns an immense volume of business, and cement the bonds of business relations between user and manufacturer, by rendering expert aid at such times.

However if, as is often the case, the trouble occurs in territory where the manufacturer of the finish or the equipment in question, has no personal representation, then correspondence must be resorted to. Now it's a fact that many foremen finishers dislike to take the initiative in starting correspondence on such matters. It's too much like writing complaints. It involves getting letters through their own company's office and the manufacturer's office to some unknown individual who possibly may help them.

Every foreman finisher, however, would welcome the receipt of occasional voluntary service letters or literature from a prac-

tical service man representing the manufacturer of the finishers or equipment he is using. A good service man at the manufacturer's office could render distant customers some excellent help by anticipating any seasonable or other trouble they might encounter, and then sending out the right kind of service letters. Occasional questionnaire letters, and letters inviting communications from the foreman finisher, would often accomplish a great deal of good.

The main thing is to establish and maintain contact with the trade—if it cannot be personal contact through representatives, then let it be the next best thing, which is contact through correspondence. Concerns who do this, command the respect and confidence of their customers, and they build up a reputation and prestige which attracts more profitable business as time goes on.

Permanence Demanded in Modern Finishes

Higher standards of living are responsible to a great extent for the increasing demand for better quality in finishing and painting. It is not enough today to make the finished article shine with beauty and lustre only long enough to tempt the buyer to part with his money. Buyers of finished articles have been educated to expect more than this.

People have learned that the function of finish coats and paint coats is to preserve as well as to beautify. If a finish or a paint is to save the surface beneath, then that finish or paint itself must be preserved—at least for a reasonable length of time. This "reasonable length of time" is being considerably lengthened, as more lasting finishes are being produced and more satisfactory methods of applying them are being developed.

Today, finished and painted surfaces must have a degree of permanence that heretofore has not been so much in demand. Manufacturers of high-quality goods have spent a lot of time, energy and money educating buyers to appreciate the merits of their products, and chief among these merits has been the "permanently beautiful, permanently durable" finishes. As a result other manufacturers have had to improve their products so as to be able to meet this competition.

Today one of the outstanding talking points of many automobile salesmen is the finish on the cars. The same applies in the selling of furniture, both wood and metal, as well as of an immense variety of other articles which are intended to be useful, but which are made attractive and decorative also.

Interior finishers, decorators and painters, who cater to the better class of work, stress up this feature of permanence. It silences any quibbling about costs, and it remains an advertisement for the craftsman long after the price is forgotten.

Standards of living have been elevated to the point where the majority of people are willing to pay the increased price for a high-quality permanent finish, if they are convinced that this is what they are going to get. It's up to finishers, therefore, to bend their efforts toward learning what finishes are of dependable quality, then obtaining them, and finally applying them under such condi-

tions and by such methods as will insure permanently satisfactory results.

Cleanliness Supreme.

In industrial finishing there is no one condition of greater importance in so many phases of the process as simple cleanliness. Cleanliness is a necessary factor to satisfactory workmanship and to the final result. Nothing else, no matter what the cost, will make up for its absence.

To produce a satisfactory finish the workmen need at the very start, clean surfaces; then follows a clean room to work in, clean finishing materials, clean wiping, rubbing and abrasive materials, clean compressed air, clean drying air, clean brushes, clean racks —in fact clean everything.

Real cleanliness recognizes no comparative degree or percentage ratio. What the finisher works on, what he works with, and the place he works in—these either are clean or not clean. If they are not clean, there exists a faulty condition which will prove costly in more ways than one, and it should be remedied. Where there is not cleanliness there cannot be either satisfactory or economical workmanship.

It costs time and effort, and perhaps some real money, to keep things clean, but there is no economy in allowing them to be otherwise. Foremen finishers, let your slogan be "Cleanliness at any price!" It's worth it. Modern civilization glorifies cleanliness; Nature provides for it, man admires it, and every finisher should work for it.

Mixed Paint Prices Advance.

Announcements of advances in prices of mixed paints have been sent to the trade by some of the leading producers, and it is felt that all will follow suit soon. These advances range from 25 to 35 cents a gallon. This action has been expected because of the high prices of raw materials.

Production Of Turpentine And Rosin Increases.

The U. S. Department of Commerce announces that, according to the data collected by the Bureau of the Census in co-operation with the Bureau of Chemistry, Department of Agriculture, the establishments engaged primarily in the manufacture of turpentine and rosin from crude gum reported products valued at $35,166,715 for the crop year ended March 31, 1924. This represents an increase of 50.9 per cent as compared with $23,300,845 for the year ended March 31, 1922, the last preceding biennial census year.

Banana oil is a cotton solution which will protect wood from the air but not from moisture, as compared to the more modern type of wood lacquer.

After all, one of the most convincing silent salesmen a manufacturer can employ is the quality and workmanship of finish on his product.

Advancement for Hilo Varnish Co. Executive.

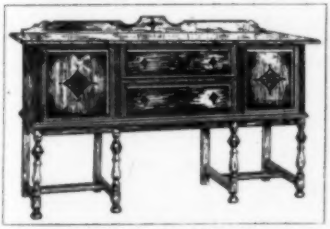
At the recent annual meeting of the Hilo Varnish Co., H. Uehlinger, assistant treasurer, was elected to the vice presidency of the corporation. Mr. Uehlinger is a well-known authority on credit matters in the industry and a prominent figure in the affairs of the National Association of Credit Men.

Period Finishes—Tudor

Revealing how and when the original Tudor style in furniture started, and what methods are employed to produce correct finishes on characteristic Tudor designs of modern furniture, in oak, walnut and mahogany

By R. J. Meade

THE battle of Bosworth Field ending the war of the Roses, and the accession to the throne of the victorious Owen Tudor as Henry VII, marked the close of the Gothic period in English history and the beginning of a much needed era of peace. But whereas in other European countries the spirit of the Italian Renaissance was dominating furniture design, England developed a style of her own. Taking its name from the line of sovereigns starting with Henry VII, it continued to flourish under Henry VIII, Edward IV, and Queen Mary.



Typical Tudor sideboard.

The importation of Italian artisans under Henry VIII introduced a number of Renaissance details, but there was no radical change until Flemish workmen crossed the channel in the reign of Queen Elizabeth. So marked were the alterations which followed that her name has been given to a distinctive period. During this time Gothic symbols mingled with Florentine scrolls, diamond and wainscot paneling, heavy turnings, and the ever present Tudor Rose, emblem of the royal house.

The chief woods employed were oak, elm, beech, chestnut, ash, walnut, sycamore and cypress, and by way of finish, paint was preferred to wax, oil or polish. A favorite color was green but though we know of the painting from writings, surviving originals have had all traces of such finish worn through to the bare wood. This surface was then oiled or waxed and the resultant effect is all we have to go by, in the way of color precedent.

Modern Tudor designs take the form of dining room suites, cabinets, living room pieces and sometimes bedroom suites. Oak and walnut are the customary woods and two-tone effects are extensively employed to emphasize and largely to take the place of the rectangular panels so characteristic of the original pieces. Very often Tudor "mahogany" furniture will be met with, but as this cabinet wood was not introduced into England until 1597, and then only as a curiosity, real precedent is lacking.

Finish practice is based on the wood, and the method for each follows:

Oak—Either an oil or a water stain may be used; if the former, high light by wiping the wet stain from all raised parts and in panel centers; in the case of the latter,

wait till the stain is dry and perform the same operation with very fine sandpaper. The work must be done with great care so as to show a very gradual blending from light to dark and not a sharp line of cleavage. The difficulty is not so much on carved work as on the fronts and flat top surfaces.

Tudor is strictly an open-pore finish, therefore no filler should be employed. The stain may range in shade from a Flemish red to Jacobean brown, although variations through the use of black and gray toning stains are entirely proper. Antiquing in the sense of rotten stone dusting is not practiced. As a protective finish over the stain, shellac and wax or flat varnish or thin coats of lacquer may be employed. A dull, more or less lifeless, matte lustre most closely approximates the true "patina" of originals.

Walnut—Here also an oil stain may be employed, somewhat darker than standard American walnut, or a water stain made up of about 4 oz. walnut crystals or aniline powder to the gallon of hot water. The latter may be toned to a deeper shade with a pinch of nigrosene to the gallon of stain. On two-tone work, where an open-pore finish is being produced, the stain may be cut one-half in strength for the lighter parts.

If it is desired to fill, however, the filler should be applied over a wash coat of shellac or lacquer on those parts intended to be light. In this way a less pronounced two-tone effect will be secured, but the difference in shade will be noticeable owing to the presence of both stain and filler only on the parts intended to be dark. The line of demarcation between light and dark is usually marked out by routing in diamond or other geometrical designs. Sometimes this routing is lined with ebony, chrome yellow, or gold bronze to heighten the effect. High lighting and shading are permissible on walnut, though not as frequently practiced as on oak. The protective finish is as specified for oak except for the wax.

Mahogany—This purely modern finish is carried out with an Adam or Antique Brown water stain, mixed with from 4 to 6 oz. of powder to the gallon of water. Red mahogany filler is then used, followed by shellac and varnish or heavy bodied lacquer rubbed dull. Tudor mahogany is usually confined to the cheaper styles in dining room suites, and an oil stain of the same strength is therefore occasionally substituted, especially on birch parts.

Care of Sample Products in the Finishing Room.

A finishing room operates at a decided handicap when no adequate provision is made for the storage of sample products. Many supply houses regularly mail specimens of their lines, sometimes their salesmen distributing them to possible prospects. It behooves the finishing department foreman to take care of these samples and to try them out as time offers.

Of course, it is not always practicable to test a new line, the foreman probably being satisfied with the materials being used and thinking he would only be taking foolish chances with unknown products. Yet, even in the case of new products, experimentation can be afforded be-

cause it is only that finishing room which does not try out new things, that naturally does not find out the merits when they are there.

Always new chemicals are being produced, new waxes, new sandpapers, and similar articles. When a strange house sends a given sample, every courtesy and interest should be shown. Too often an indifferent foreman will throw a worthy sample product aside, to his later regret.

Even when, for the time being, it is inadvisable or inexpedient to try out a new line, samples that are on hand should be retained for possible later use. Storing them in a sacred place, where they can always be found immediately, will often save finishing rooms much time, worry and money later. That is why the progressive plant provides a special storage place, mainly for samples and for information relating to same.

In the case of large factories a special room should be provided, where catalogs and sales literature of all products that the finishing room uses, can also be kept. In one large piano factory there is a little room exclusively for the sample supplies and related matter. In this room are kept records concerning the new lines. When a sample of a filler, for instance, is received it is soon tried out, the results recorded in a special book, and then comparisons are made. The different executives periodically discuss the various advantages of different samples and particularly where an improvement shows, an order is given on new products.

Naturally, when a finishing department prepares for the future this way, it is up on nearly every new product about which the executives should know. There is little uncertainty. The piano factory's executives think so much of their samples and sample room that only those having authority are permitted to enter the room, which is securely locked. Since not everybody can gain access to it, and since only the one place is provided for samples, there is never any trouble involved in finding a given sample.

So far as the small shops are concerned, even these will do well to set aside at least a small space where samples of all kinds can be kept. If it is only a little closet, there need never be any need for groveling among a lot of other matter to find a sample can of paint or that sample wax. The timely provision will avoid all that. Better care of samples, it should be almost needless to state, will enable the purchasing department to make many wiser purchases. This is all the more true when from time to time tests are made of the sample products, and when suitable checking up of results are made.—F. V. Faulhaber.

A waterproof sand paper has been developed which is especially adapted to "wet sanding", as it is practiced in the finishing departments of so many automobile body shops.

M. F. Emrich Becomes a Director in The Glidden Co.

In recognition of his many years of service, and unusual attention to matters under his direction, Mr. M. F. Emrich was recently elected a director in The Glidden Co. Mr. Emrich is well known in the many industries served by his company and his many friends who have known him during his 35 years of service will be pleased to learn of the honor bestowed upon him.

Walton H. Price Elected to Lucas Board of Directors.

At a meeting on December 8th, Mr. Walton H. Price was elected to the Board of Directors of John Lucas & Company, Inc., to fill the unexpired term of John Lucas, deceased.

Mr. Price has had continuous and wide experience in the selling end of the paint and varnish business, both in trade and industrial sales. Leaving the Balti-

more City College when a young man, he entered the employ of the Sherwin-Williams Company in 1901 as a salesman in the south. Two years later he was transferred to a territory with Baltimore as headquarters, and remained in this field until 1916 when he resigned to accept a position with the Cleveland Varnish Company.

In 1917 Mr. Price was called to Cleveland for special work at which time he was also placed in charge of sales of the Black Department, an important part of the Cleveland Varnish Company's business. In 1919 he was made general sales manager of the company, which position he held until January, 1922, when he became associated with the Lucas organization. Mr. Price is located at the home office of John Lucas & Company, Inc., in Philadelphia, and is in charge of the industrial sales work of the company.

The man who shows his personality by his work is a workman of the highest skill. He keeps himself informed about the latest methods, the best materials, and how to use them. He jealously guards his reputation by insisting on doing high-quality work at all times and under all conditions.

Each intermediate coat of varnish, paint, enamel or under-coat used on a high grade job should not only bind to the coat beneath and perfectly support the following coats, but it should also help to give depth and fullness to the job.

The Committee on Color Terminology, of the Optical Society of America, will undertake a work, the need for which has been apparent for some time. Color terminology has been little understood and as a result many colors are known under various names. In order to obtain the most comprehensive survey of the situation, this committee on color nomenclature has prepared an elaborate questionnaire which will be distributed to representative industries that use colors. These industries will be asked to give this important matter their earnest consideration, so that a clear understanding of descriptive color terms may be reached.

Questions and Answers

This service department is conducted to meet the readers' need for prompt information on specific problems, and to give others an opportunity to review the questions and to offer comments, suggestions or answers

What Will Bleach Basswood White?

We would like very much to know what chemical or chemicals can be used economically and effectively in bleaching large quantities of basswood match splints white.—L. M. Co.

How Would You Finish Iron Bed Ends?

We are about to grain walnut iron bed ends and want to turn them out with as little expense as possible. They are round tube parts. I thought of giving them one coat of ground color and one cont of graining color, followed by one coat of varnish. Would it be possible to use a composition roller and a blanket? Possibly someone can suggest a better procedure.—W. T. C.

What Will Remove Printed Marks From Sheet Iron?

We would like to know if there is some substance or method by which we can remove marks, such as printer's marks, which show the sizes of sheet iron. We have found from experience that paint removers, and sanding these marks, will not remove them satisfactorily, as they appear on the surface when sheet iron is sprayed with light colored lacquer.—S. Pump & Equipment Co.

It's the individuals who face their problems promptly who are our leaders.

Why Some Finishes Check or Craze.

Referring to A. K. J.'s question on page 41 of January issue about checking and crazing, this is usually a fault of the varnish, augmented by a condition under which it is used. Frankly speaking, some manufacturers are, as a rule, to blame themselves when their varnish will check or craze. With oil at $1.00 a gallon, and gums equally advanced in price and scarce, it is difficult to see how varnish makers can produce a varnish that isn't subject to these ills, at less than $2.50 per gallon. With this in mind, I suggest you put the problem back to the man who supplies your material.—W. K. Schmidt.

What Causes Varnish To Check or Craze.

In January INDUSTRIAL FINISHING appears a query from A. K. J. regarding the cause of varnish crazing. There are two causes of what is called crazing, each distinct from, and independent of the other. The first cause is the shrinking of certain oils in the varnish.

As is well known to all varnish men, varnish hardens by absorbing oxygen from the air, rather than by evaporation of volatile liquids. During recent years, experiments have been conducted with many oils, and I believe the general opinion is that none of them surpass linseed oil. Frequently some other oils are add-

ed to the linseed oil in varnish, but these oils are not as permanent in their nature as linseed oil. After these oils have reached a certain stage in the process of oxidization they shrink, and in shrinking they check.

Some oils shrink badly—so much so that a surface coated with varnish, which contains such oils, becomes in time covered with great wide cracks. These cracks become wider with the passing of time and exposure to air. After these oils have absorbed a certain amount of oxygen, the process seems to be reversed. The air begins to corrode the oil; in other words, to eat it away, leaving only the varnish gum.

The solution of the problem here presented is to use only such varnishes as are known to contain none other than permanent oils. Buy only from reliable varnish makers, and avoid cheap varnishes for they are costly at any price. It does not always follow that high-price varnishes are good, but it does most certainly follow that low-price varnishes are of inferior quality.

The second cause of varnish checking is frequently to be found in some movement in the wood below the finish. Such checking differs from crazing, and is found only on veneered work. The varnish in such cases becomes literally filled with fine checks, as a result of fine checks in the veneer. These checks differ from crazing in appearance in that crazing appears more like a county map with towns and townships all outlined, while checks arising from defective veneer usually are parallel to each other, and are not quite so open as in the case of crazing.

Veneer for a high-class finish must be perfectly sound in every respect. All too frequently the finisher, or his material, is blamed for defects which have their inception in the veneer beneath the finish, and are the result of causes over which he has no control. A finish is a delicate thing at the best of times. It is not a steel band to hold defective woodwork together, as some seem to imagine it to be. Because a finish is a delicate thing, it is necessary that the surface on which it is applied be as nearly perfect as possible if the finish is to be durable.—Carl M. Tremaine.

Treating Sapwood To Match Heartwood.

Replying to J. K. M. in January INDUSTRIAL FINISHING, the best way to treat hard sapwood in staining in order to match it up with the heartwood is to first stain the sapwood with the same kind of stain as it is intended to use on the whole surface. The depth of color to be imparted to the sapwood can be regulated by the quantity of stain applied in the first coat. Some experience is necessary to get just the right amount to correctly match the heartwood after the second coat is applied, but a little practice will enable the stainer to do this so well that not even the experienced finisher can tell which is sap and which is heart after the wood has been filled and shellaced.

Sometimes the stainer is confronted with a piece of sapwood that is slightly dozed, which will take stain too darkly. Such wood, instead of being stained twice, will have to be treated to prevent the one coat of stain from making it too dark. Here again, experience is necessary to get the

correct results, for the stainer must know beforehand that the wood will take dark, and have a pretty accurate idea of how much too dark it is apt to be.

To treat this piece of wood, coat it with clear water before stain is applied. The stainer can tell pretty well by the rapidity with which the water is absorbed how much will be required. By filling the soft wood with water in this way, and at this time, the stain will take lighter than it would if the wood were dry, as water prevents the stain from penetrating as it otherwise would do. The extent to which this dozed wood is filled with water will determine the amount of stain which it will absorb, and the depth of color obtained. Do not attempt to apply stain until the water has disappeared from surface of the wood. If, after stain has been applied, the wood at this point has the appearance of being too light, apply a little extra stain to help even it up; if too dark, even it off with a rag. As I said before, it requires some experience to do this well, but it can be done.—Howard Brent.

Bringing Sap Wood Up to Color.

In reply to the question of J. K. M. on this subject in January issue, page 41, sap wood can be darkened to match the heart wood by skillful staining. Whether you are using water or oil stain, the handling thereof is practically identical. Where much of this work is to be done, I would reduce the original stain to such a strength that when dry, it matches in depth of color, the dark wood, which is the heart.

Prepare a brush by cutting it diagonally, so that you have long hairs on one side and very short ones on the other. Then chisel them off so that they are not only short, but thin and pointed. With this brush you do the blending next to the dark wood, and with a wider brush, carry it out on the sap. Now, when this is dry, go over the entire piece, and the job should come out quite satisfactory. All that is needed is a little practice on the part of a man who likes to do this fussy kind of work.—W. K. Schmidt.

Staining Sap Wood to Match.

In the January issue, under "Questions and Answers," I notice an item entitled, "What is a good method of bringing sap wood up to color?"

I have been connected with the manufacture and finish of cedar, walnut, gum and mahogany chests for the past five or six years. Almost all of these woods require quite a little cutting-in to bring sap wood to the color of the heart wood. I have tried, in all possible ways, to do this with a brush, but the results obtained were unsatisfactory at the best, because it showed a lap from the sap to the heart wood.

This was finally overcome by using an air brush with a half-pint container attached, using water stain. It is possible, with the air brush, to hit the sap wood and then gradually blend the stain out until you cannot see a lap after sanding. I have found that this gives perfect results on any of the above mentioned woods. It is simply a matter of experimenting with water stain until you get the proper mixture. —F. Gaumer.

Oiling Before Filling.

Under the above heading A.K.A. asks in January issue of this journal what some of us think about the practice of oiling porous woods before filling, in order to prevent the wood from robbing the filler of its oil

One of the principal objections to oiling the wood, is the time required for the oil to dry sufficiently hard to enable one to build upon it a good, durable finish. The outer surface may appear hard, but just under this surface it is not dry unless a considerable time has been allowed for drying. The time necessary depends upon atmospheric conditions such as temperature and humidity.

A very thin coat of shellac is better than oil for the purpose, as it dries hard in a very short time. If bleached shellac is used it will not darken the wood as much as linseed oil. If it is desired to darken slightly, this can be done by the use of orange shellac. Shellac, cut as thin as 1½ lbs. of gum to a gallon of solvent, will be very effective in sealing the pores of the wood against absorption of oil from the filler.

However, this all represents unnecessary work. The difficulty can be overcome by using a larger proportion of oil in the filler. Persons finishing walnut and mahogany are frequently up against this problem. Most finishers wash-shellac their mahogany before filling, in order to sand off any fuzz that the water stain has raised. This wash-coat of shellac seals the pores of the wood against absorption of oil in the filler. The filler is usually made short in oil to meet the requirements of the mahogany. Then when finishers use the same filler on walnut, which has not been shellaced previously, they add a small amount of oil to take care of the extra absorption of this bare wood.

Filler should dry flat within ten minutes after being applied. If a filler, containing the correct proportion of oil for bare wood, were applied over a thin coat of shellac it would not dry flat within the specified time. It would be stiff and sticky when cleaning off. On the other hand, if filler was prepared with the correct proportion of oil for wood previously shellaced and then applied to wood that had not been shellaced, it would dry flat in less than the time specified, and it would act floury when being cleaned off. Such filler, applied in that way, might not have sufficient oil remaining after it was dry to bind the particles of pigment together. The bare wood would have drawn it away. A little experimenting with filler on wood that has been shellaced, as well as on wood that has not been shellaced, will enable one to have the correct proportion of oil to get best results.—W. J. Tyson.

Finishing Incubators.

F. W. R. & Co., Ltd., London, England, asks how to finish incubators made from American chestnut so as to present a better appearance than is usual with this class of goods. There are a great many ways by which these goods may be finished, and it is difficult to know just what is wanted. However, I will give a method for finishing which can be varied as desired. I believe that for this class of work it would be better not to have the wood very dark, but if the following method does not make it

as dark as desired, the wood can be stained with an oil stain, and the coat of shellac be eliminated.

First, put on a good coat of orange shellac. Shellac gum comes in various shades of orange and I would suggest that a deep colored shellac be used. Then apply a coat of pigment surfacer made as follows: Make a mixture consisting of 1 qt. brown Japan, 3 qts. good varnish and 1 pt. turpentine. Sift into this mixture finely ground silex in the proportion of 1 lb. of the silex to each quart of the mixture. Stir well, then set away for 24 hours. Strain through cheese cloth or book muslin, after which it is ready for use. This pigment surfacer can be applied one day and will be dry enough to sandpaper on the day following. After sandpapering apply a good coat of varnish. Use good materials if a durable finish is desired.—P. T. Wallace.

Those Sunken Places in Varnished Surfaces.

We note in January issue, page 41, that the H. Cabinet Co. have difficulty in varnish sinking. The problem is one that comes up frequently in various parts of the country, and it has been our experience that as a rule, it's due to some condition, rather than to any of the finishing materials. In order to get at a thing of this kind right, we should see a piece so affected. Otherwise, we could just give conjectures and recommendations, based on experience only, taken from similar cases.

We have found that veneer, rotary cut, sometimes made from a shaky log, will do this sort of thing. We have found that moisture, hidden in the cowls, is the cause of this trouble. It's apt to manifest itself on a rotary-cut veneer. We think the problem is a veneer man's problem.—Industrial Laboratories, Inc.

Why Varnish Seems To Disappear.

In January issue of INDUSTRIAL FINISHING, The H. Cabinet Co. seeks information regarding the cause of what it calls the "sinking away of varnish in places on veneered pieces—tops, drawer fronts and end panels." The writer of the query is on the right track when he says "The grain of the veneer has the appearance of curling upward just sufficiently to break the filament of the several coats of varnish." That is exactly what takes place. The trouble is in the veneer; no amount of sanding, nor of filling, can remedy the matter permanently.

Veneer has a right and a wrong side; this is especially the case with sliced and rotary-cut (knife cut) veneer. The right side of rotary-cut veneer is that side which is on the outside of the log at the time of cutting. The wrong side of veneer is that side which is nearest the log at the time of cutting.

When the slice of veneer is cut from the log it is laid out flat, and the act of laying it out flat causes such a strain on the fibers of the inner side that they rupture. In other words the inside of the veneer checks, sometimes half way through to the face, all depending on the kind of wood and the condition of the machine at time of cutting. Careful examination of the wrong side of a sheet of veneer will frequently show these checks running into the veneer on an angle, giving

that side the appearance of being made up of many scales, like the scales on a fish.

If the wrong side of such a piece of veneer is laid to the face, these scales are affected by atmospheric changes, and they "curl up sufficiently to break the filament of the several coats of varnish." If one is in doubt as to which is the right and wrong side of veneer, he can satisfy himself on this point by bending the sheet and examining the convex side; then bending it the other way and again examining the convex side. Bending the veneer in this way opens the checks and brings them more prominently to view.

Another thing that may cause the trouble complained of, is checking of the veneer after it is laid. Sometimes this checking takes place soon after the stock is taken from the press; sometimes it does not take place until after the stock has been finished —all depending on the method of handling and drying. Let us explain: All kinds of wood are influenced by moisture. Wood takes up moisture in a damp atmosphere and throws off the moisture in a dry atmosphere. Wood swells when it absorbs moisture, and shrinks when it throws off moisture. Sometimes veneer is kept in a damp basement or other damp place, in consequence of which it is filled with moisture and greatly expanded. This veneer is laid without anything being done to eliminate the moisture prior thereto. The veneer takes up moisture also from the glue, and by the time the glue is set the veneer has expanded to its limits. This swollen veneer must throw off a great deal of moisture after it leaves the press.

If veneered stock is dried in a kiln, or allowed to dry in the open shop for a considerable time before it is finished, the drying and shrinking take place, of course, before the varnish is applied. If the stock is hurried from the press through the machine and assembly operations, to the finishing room, the drying and shrinking do not occur until after the finishing is well under way, or in some instances completed.

Expanded veneer, attached firmly to a heavy core, is in a different position from veneer standing by itself. When a sheet of free veneer shrinks it can draw in from the edges; after shrinking, it is narrower than it was before. Not so with a sheet of veneer that is firmly cemented to a heavy core; it cannot draw in from the edges because the core holds it to its width, and the shrinking of the wood fibers can be taken care of only by these fibers separating one from the other.

This separation of fibers takes place along lines of least resistance, which are at the ends of the pores. When this occurs every pore is more or less affected, and that is why the varnished surface becomes filled with innumerable fine checks. Examination of such a surface under a strong magnifying glass will show the checks in the varnish to be in line with the ends of

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WHAT THEY SAY ABOUT US

"Having just read your January issue of INDUSTRIAL FINISHING, which was handed me in the office, I am well pleased withi t and would like to receive it regularly. Please let me hear from you right away as I don't want to miss the February number."—H. H. Waugh, foreman finisher, Knoxville (Tenn.) Table & Chair Co.

"Have read your INDUSTRIAL FINISHING for January and like it fine. Would like to receive it regularly at my home address."—John Stover, foreman finisher Ballman-Cummings Furn. Co., Ft. Smith, Ark.

"I didn't receive my INDUSTRIAL FINISHING for January and thinking that perhaps it was lost in the mail I am asking you to please send me another copy right away as I am very much interested in it and am saving them all for future reference."—Chas. H. Beidler, foreman finisher, Kurtz Bros., Bethlehem, Penna.

"We find INDUSTRIAL FINISHING the best magazine of its kind that we have ever had the pleasure of seeing."—Reliance Varnish Co., Louisville, Ky.

"We merely wish to congratulate you on the general excellence of your journal INDUSTRIAL FINISHING."—Rockford Varnish Co., Rockford, Ill.

"We have now received the second issue of INDUSTRIAL FINISHING and as it appears to be as good as the first we would like to receive the journal regularly."—The Projectile & Engineering Co., London, England.

"We have been receiving copies of your new magazine INDUSTRIAL FINISHING and find it to be very interesting, presenting in a practical way, many of the problems of the factory finishing department. Since the writer does all his reading at home would thank you to send me a copy regularly to the address below."—D. G. Cassady, Treas., Standard School Equipment Co., Louisville, Ky.

"I have been very much interested in your booklet INDUSTRIAL FINISHING which has been received at our plant. As I am leaving this company and am not sure that the new company for whom I am to work gets this journal I would appreciate receiving it at the address below because it contains so much valuable information."—E. F. Werner, 5707 McPherson Ave., St. Louis, Mo. Foreman finisher automobile bodies.

"We find it is a very valuable publication; it is most interesting and educating."—Robert Findley Mfg. Co., Brooklyn, N. Y.

"If we have not already been listed as subscribers to your INDUSTRIAL FINISHING, kindly put us on your list and advise what the cost is. We will gladly send you a check as we believe this book is necessary in our business."—C. H. Eiff, Vice-Pres., Milwaukee Chair Co.

"We have just seen your January 1925 issue of INDUSTRIAL FINISHING and wonder if you would put my name on your list for two copies monthly for use in our plant here. The writer feels that a magazine of this character is very helpful in a plant and INDUSTRIAL FINISHING fills this need very nicely."—Ralph W. Pratt, Heywood-Wakefield Co., Chicago, Ill.

"We believe INDUSTRIAL FINISHING may give us some ideas from time to time that will be valuable to us, therefore, we will be glad to receive the journal regularly addressed to, Chas. Kapner, Vice-Pres., The Bellaire Enamel Co.," Enameled ware of all kinds, also air dried lacquered products.

"We received your journal INDUSTRIAL FINISHING and were pleased to get it. Would like to receive it every month."—W. T. Campbell, foreman finisher Gold Medal Furn. Mfg. Co., Toronto, Canada.

Above are but a few comments on INDUSTRIAL FINISHING, picked at random from hundreds of such letters received since the first issue. On such is based the evidence of reader appeal without which no publication can progress.

Manufacturers of finishing materials, finishing equipment and kindred products are invited to investigate the merits of this publication, and its rapidly growing popularity among finishing foremen, superintendents, purchasing agents and higher executives of all kinds of industrial concerns where finishing coats are applied.

Industrial Finishing

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Beauty—Is Varnish Deep

WHAT *sells* most any article? Primarily appearance. We are all more or less influenced by appearances—and properly so, other considerations being equal. We select one desk in preference to another of the same wood and of similar construction because it looks better. So too, with many other products—one or more of which may be made by you. If you are now using

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you know the satisfaction that comes from using a dependable varnish; varnish which will "dress" your product to the best advantage—give it the appearance that will attract attention and help its sale.

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the pores where the fibers have separated.

The solution of the problem is threefold. 1—The veneer must be sound; that is it must be free from checks on the face side, and free from an undue number of checks on the wrong side. It is impossible for the wrong side of rotary-cut veneer to be as firm and sound and free from checks as is the face side, but if the stock is properly cut, the checks on the wrong side will be of such a minor character that they will not be a factor in causing trouble, if that side is laid next to the core. From this it will be seen that care must be taken in selecting veneer for fine cabinet work.

2—The veneer must be laid with the right side to the face for the reasons outlined in the preceding paragraph. If this is done the fine checks, caused by the strain on the fibers in straightening the veneer after it is unrolled from the log, will be pretty well taken care of by the glue, and will be too far away from the face to cause trouble.

3—The veneer must be dry at the time it is laid, and every precaution taken to prevent it from absorbing moisture from the glue before pressure is applied. It makes no difference whether the moisture was in the veneer before it came in contact with the glue, or whether it came from the glue in sufficient quantity to cause the veneer to swell. The ultimate effect is the same.

If veneer swells from any cause before it is firmly cemented to the core it is bound to check during the process of drying. There is no way of preventing veneer from absorbing moisture from liquid glue, but it is pos-

sible to prevent it expanding by applying the pressure before the veneer has absorbed sufficient moisture from the glue to cause expansion.

There is no method as yet known by which a durable finish can be made over veneer filled with fine checks. Careful examination of the varnish before it is rubbed, will reveal whether or not there are checks in the veneer, and whether or not, in the event of there being checks present, the varnish will stand rubbing without the checks showing through. If there is danger of the checks showing through the varnish after rubbing, it is not wise to attempt water-rubbing. The water will go through the checks in the varnish to the checks in the veneer below and cause these to enlarge.

The better way is to oil-rub this surface and if it checks give it a coat of very thin shellac. Shellac will neutralize the oil and seal the checks and hold out the subsequent coat of varnish. It is never safe to apply shellac over varnish unless the latter is quite hard; otherwise the shellac will cause the varnish to crack. Shellac for this purpose must be thin, and applied rapidly with little brushing. It usually requires about 24 hours for shellac to harden over a coat of varnish. Then it may be sanded and varnished. Usually one good coat of varnish is sufficient to fill the checks, and if care is exercised this coat will rub to a fine finish without going through.

We may as well be frank and say that the above is not a finish which will not again show the checks in the veneer. It is a make-shift, but it is the best

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method known to overcome the difficulty outside of re-veneering. —W. L. Maltbe.

Speaking of the different theories advanced for the cause of iron rusting, someone expressed the matter tersely when he remarked that it was the result of iron plus water, plus air, plus nature. Whatever the causes may be, they surely exist and there is a great demand for a dependable protective coating at a reasonable cost.

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Made in Newark, N. J., since 1857
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Container For Shellac.

We happened to notice two articles on the best kind of container for shellac, in your January, 1925, number. Up to fifteen years ago we sent out all our shellacs in small packages in either glass bottles, earthenware, jugs or wooden kegs or kits. The reason for this, as your contributors point out, is the fact that shellac, both orange and white, will discolor and in time turn almost black when kept in contact with tin.

One of your correspondents says that metal containers are all right for white shellac but that orange shellac should be stored in either wooden or earthen vessels. As a matter of fact, both orange and white shellac will turn black on contact with tin or iron, and this can be easily proven by putting a small nail in a bottle containing either white or orange shellac, and it will be found that the shellac will darken rapidly.

The point we want to bring out, however, is that we have been sending out white and orange shellac of the finest quality put up in metal cans. These containers are made from special lead-coated composition. We have found a special metal which will not affect the color of the shellac even if it is kept for six or twelve months in a can, although we naturally do not favor keeping shellac that long in any sort of container, as it does not improve with age.

Our special composition cans are much more satisfactory than breakable glass or jugs, particularly for the one-gallon and five-gallon sizes, and as they have handles and spouts similar to the ordinary tin can and can be

boxed in wooden cases, they make a much more serviceable, handy, light and inexpensive form of container.

The fact that we have been using these containers for more than fifteen years without any trouble is of course, the best evidence that they are entirely satisfactory.—W. Z. & Co.

More About Shellac Under Green Enamel.

I appreciate the INDUSTRIAL FINISHING Magazine and since you are kind enough to send it, I will try and help out occasionally. In Question Department, page 58, December issue, parties are speaking about shellacing kiln-dried maple slats, with a view to satisfying the wood so one coat of green enamel will suffice for a finish coat.

It is not stated whether the chairs are to be used outside or inside of the house. If inside, it will be allright providing the chair is not brought too near the heat or the Sun's rays from a window. Shellac has a tendency to soften with heat, and on exterior work I have known it to peel off, sometimes in sheets if put on bare wood as a primer under a paint coat. If shellac is used at all, it should be applied over a paint coat or between coats, and since speed is what they are after I should think that a first coat of lacquer would fill the bill, followed with a coat of green enamel.

Since lacquer would increase the cost, why not use something else that would give the best of results but would take a little longer to dry and be two-thirds cheaper? If the parties are interested enough, let them write me and I will explain fully some-

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The Don-O-Lac Company
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thing that I am using that is giving me results right along, but it cannot be printed here on account of showing favoritism. One coat of green enamel, over one coat of this, would hold out with a high gloss on bare wood. Shellac does not penetrate the wood surface deeply, and dry shellac when heated on the stove will run like thin syrup, which is proof enough that it ought not be used in certain cases on a wood ground.—Daniel W. Snow, Santa Cruz, Calif.

That Sweating of Varnish.

I noticed an article in the December issue of INDUSTRIAL FINISHING where Mr. Wm. G. Pinner described the sweating of varnish and how to prevent same. I will frankly say that what he calls "varnish sweating", is far from what I call it.

What I call varnish sweating is when you rub the lustre to a flat appearance, and then the lustre will appear again if it is allowed to stand for a few hours. I claim that the cause of varnish sweating is that the second coat is applied before the interior coat of the first has dried thoroughly; therefore when the second coat is applied, the exterior surface of the first coat softens and it will take about four days for all coats to dry.

As a matter of fact, any brand of rubbing varnish will sweat out after you rub it, if what it is applied over, is not dry.

The cause of one color coat looking different from another, when you rub through, is an inferior grade of varnish, or one coat containing more color than the other.

I am not writing just to criticise some one. It is my aim to help along the cause of better finishing knowledge and understanding in any way I know how. —W. G. Campbell.

As a pigment graphite has come very much to the front of late years on account of its admirable anti-corrosive properties. Large quantities are used nowadays in the preparation of the many graphite anti-rust paints that are put on the market and sold for painting iron structures such as bridges, etc.

Manufacturers of high-grade interior woodwork usually make it a practice of protecting the backs of thin trim and paneling with an application of oil paint or asphaltum varnish. This prevents expansion on the back, which might result in warping, "cupping," or checking on the face.

One of the problems that has developed, through the use of wood lacquer, is to find a suitable filler for the job. The general trouble seems to be the turning gray of the filler in the pore and this, of course, is caused by reaction between the liquids in the lacquer and the materials from which the filler is made.

The principal enemies of an ordinary varnished surface are heat and moisture.

Good light is a tangible economy factor in every manufacturing process.

The introduction of a new finish always meets with opposition from somewhere.

In tumbling barrels a vegetable wax is often used to give the desired gloss to small turnings, not otherwise coated.

NEW No. 136

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Shellac bleacher and importer wants a representative in each of the furniture manufacturing centers in the United States to sell on commission basis. May arrange to carry stock in each locality. Apply, giving references and selling experience. Address IF-104, care INDUSTRIAL FINISHING.

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Wood Stains—Wood Fillers—Shellac—First Coaters—Lacquers—Enamels — Oil and Japan Colors. A manufacturer of the above of fifty years' standing wishes to obtain sales representation in furniture manufacturing centers in the United States and Canada. An opportunity awaits the man who can show results. Address IF-101, care INDUSTRIAL FINISHING.

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A thoroughly practical piano and cabinet finisher who also is familiar with the wood-working end of these two industries as a service man for one of the largest paint, varnish and lacquer manufacturers. Address reply, giving full details of experience, to IF-105, care INDUSTRIAL FINISHING.

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Modern wood-working plant equipped with late improved machines, individual motor drive preferred, but not absolutely essential. Interested in the machinery and equipment only. Wanted for quick delivery. Send full details, inventory and selling price in first letter as quick action is wanted. Motors for 3-phase, 60-cy., 220-volt, A. C. preferred. Address IF-102, care INDUSTRIAL FINISHING.

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By large case goods factory in Indiana. One of the best equipped and systematized plants in the state. Man must have thorough knowledge of wood-working game from the cut-off saw to the finished product. Must be a man who can get production at reasonable costs. The man we want is employed and giving satisfaction, but wishes to change because he wants to better his condition or has some other good reasons for making change. Here is a rare opportunity for the right man. Give age, number of years with last employer, qualifications for the position, salary you are now receiving. Address IF-106, care INDUSTRIAL FINISHING.

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An experienced salesman, thoroughly conversant with the wood-finishing trade, with a complete, practical knowledge of the application and sale of wood-finishing products. Territory consists of southern and eastern part of Pennsylvania and the New England States. A man acquainted with this territory and who has a following, is preferred. Liberal salary and commission arrangement for the right man. Answer, giving references, business experience, age, salary, etc. The line is well known and has high reputation for quality. Address IF-103, care INDUSTRIAL FINISHING.

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Complete combination paint removing and lacquer and varnish drying outfit, consisting of two units—heating boiler and dry room. Little used. Cost $3,000. Forced to sell account change of business. Heating boiler is 10-h.p., gas-fired; high-pressure steam available in twenty minutes for removing chassis grease and old body finish in one hour. Fittings include gauges, cocks, safety valves, eight adjustable gas burners. Also used at low pressure to furnish heat for dry room, which consists of Drying Systems complete unit with curtains; machinery; piping; heating coils; motor-driven blower with 2-h.p. motor; air washing and humidity attachments. Capacity one to nine automobiles. First $1,000 takes complete plant, including operation instructions. Will sell gas boiler separate for $500. Drying part of outfit can be used for furniture or metal work. LAMBERSON JAPANNING COMPANY, 1164 W. 22nd St., Chicago, Ill.

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